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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,743	02/04/2004	Akiko Kitami	04075/LH	6817

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EXAMINER

GARCIA JR, RENE

ART UNIT PAPER NUMBER

2853

DATE MAILED: 06/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/772,743	Applicant(s) KITAMI ET AL.	
	Examiner Rene Garcia, Jr.	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,9-14,16,17 and 21-24 is/are rejected.
- 7) ☒ Claim(s) 3,6-8,15 and 18-20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claim Objections

2. Claim 6 recites the limitation "the ejection pulse" in line 1. There is insufficient antecedent basis for this limitation in the claim.
3. Claim 7 recites the limitation "the ejection pulse" in line 1. There is insufficient antecedent basis for this limitation in the claim.
4. Claim 18 recites the limitation "the ejection pulse" in line 1. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 19 recites the limitation "the ejection pulse" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 4, 5, 9-14, 16, 17 and 21-24 are rejected under 35 U.S.C. 103(a) as being obvious over Kitami et al. (US 6,908,167) in view of Nakazawa et al. (US 6,174,038).

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The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Kitami et al. discloses the following claimed limitations:

*regarding claims 1 and 13, droplet ejection apparatus/**ink-jet recording apparatus**/ comprising: (col. 1; lines 6-8)

*drive signal generator for generating a set of drive signals including a plurality of drive pulses (col. 7, line 50)

***head/recording head, H**/ for ejecting a droplet from a nozzle/**3**/ provided corresponding to a channel/**ink channel, A [A1,A2,...]**/, by changing a volume of the channel according to the set of drive pulses selected (fig. 1, 2a-2c; col. 8, line 65-col. 9, line 6; col. 7, line 51- col. 8, line 2)

*wherein, the drive signal includes a micro-vibration pulse/**fine vibration waveform**; **fig. 5/** as one of the drive pulses to generate a micro-vibration of meniscus in the nozzle/**3/** in such a degree that the droplet is not ejected (col. 2, lines 38-42), said micro-vibration pulse being formed of a rectangular wave which include at least one micro-vibration pulse having a pulse width of $(2n) AL$, where AL is $1/2$ of the acoustic resonance (col. 8, lines 3-13) period of the channel, and n is an integer not smaller than 1 (col. 11, lines 40-50)

*regarding claims 2 and 14, rectangular wave having a pulse width of $2 AL$ (col. 11, lines 58-60)

*regarding claims 4 and 16, micro-vibration pulse/**fine vibrating waveform/** is applied before an ejection pulse/**jetting driving waveform/** for ejecting the droplet is applied (fig. 5; col. 12, lines 57-63)

*regarding claims 5 and 17, rectangular wave having a pulse width of $(2n) AL$ is applied at the last timing of the micro-vibration pulse/**fine vibration waveform/** (fig. 4 & 5)

*regarding claims 9 and 21, maximum extrusive amount of the meniscus by the micro-vibration pulse /**fine vibration waveform/** is not larger than a radius of the nozzle (col. 4, lines 18-24)

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*regarding claims 10 and 22, head/**H**/ comprises an electric-mechanical conversion element which changes the volume of the channel by the application of at least one of the ejection pulse or the micro-vibration pulse/**fine vibration**/ (col. 4, lines 13-35)

*regarding claims 11 and 23, electric-mechanical conversion element comprises a piezoelectric material which forms a partition wall between adjacent channels, and which is deformed in a shearing mode by applying a voltage (col. 13, lines 9-18)

*regarding claims 12 and 24, droplet is an ink droplet (col. 4, lines 15-16)

Kitami et al. does not disclose the following claimed limitations:

*regarding claim 1, drive pulse selector for selecting a set of drive pulses in accordance with a print datum of each pixel

Nakazawa et al. discloses the following:

*regarding claim 1, drive pulse selector/**selector, 150**/ for selecting a set of drive pulses in accordance with a print datum of each pixel (fig. 1; col. 6, lines 25-28) for the purpose of determining if recovery or ejection of nozzle is required

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a drive pulse selector for selecting a set of drive pulses in accordance with a print datum of each pixel as taught by Nakazawa et al. into Kitami et al. for the purpose of determining if recovery or ejection of nozzle is required

Allowable Subject Matter

8. Claims 3, 6-8, 15, 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: The primary reason for the allowance of claim 3 is the inclusion of the limitations being for a droplet ejection apparatus including a micro-vibration pulse that includes a rectangular wave having a pulse width of 1 AL and a rectangular wave having a pulse width of 2 AL. It is this limitation found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 6 is the inclusion of the limitations being for a droplet ejection apparatus including an ejection pulse is applied after 1 AL from the time when the rectangular wave having the pulse width of $(2n)$ AL is applied at the last timing of the micro-vibration pulse. It is this limitation found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 7 and 8 is the inclusion of the limitations being for a droplet ejection apparatus that first pulse formed of a rectangular wave to expand the volume of the channel, and 1 AL later, restoring it to an original state; second pulse formed of a rectangular wave to reduce the volume of the channel, and a prescribed period later, restoring it to the original state; and wherein a voltage of the first pulse V_{on} is higher than a voltage of the

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second pulse Voff. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 15 is the inclusion of the method steps for a droplet ejection apparatus being micro-vibration pulse is includes a rectangular wave having a pulse width of 1 AL and a rectangular wave having a pulse width of 2 AL. It is this step found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 18 is the inclusion of the method steps for a droplet ejection apparatus being an ejection pulse is applied after 1 AL from the time when the rectangular wave having the pulse width of (2n) AL is applied at the last timing of the micro-vibration pulse. It is these steps found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 19 and 20 is the inclusion of the method steps for a droplet ejection apparatus being rectangular wave having the pulse width of (2n) AL is applied at the last timing of the micro-vibration pulse. It is these steps found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Response to Arguments

10. Applicant's arguments, see page 5 line 14 to page 6 line 3, filed 13 March 2006, with respect to the rejection(s) of claim(s) 1-5, 10-17 and 22-24 under 102(b) have been fully

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considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kitami et al. (US 6,908,167) and Nakazawa et al. (US 6,174,038). Kitami et al. discloses the a fine vibration waveform including pulse having pulse widths of $2n$ AL used to agitate ink meniscus and Nakazawa et al. includes the selection of pulse signals based on data from CPU, as provided in rejection above.

Conclusion

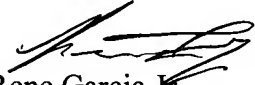
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takahashi (US 6,109,716) includes a second pulse to control the viscosity of the ink. Chang (US 6,371,587) also includes a fine vibration pulse for control of the ink viscosity.


Communications with the USPTO

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rene Garcia, Jr. whose telephone number is (571) 272-5980. The examiner can normally be reached on M-F 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Rene Garcia Jr
05/06


STEPHEN MEIER
SUPERVISORY PATENT EXAMINER